

January 26, 2009

The Honorable Chairman and Members of  
the Hawaii Public Utilities Commission  
465 South King Street  
Kekuanaoa Building, 1st Floor  
Honolulu, Hawaii 96813

PUBLIC UTILITIES  
COMMISSION

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Dear Commissioners:

Subject: Docket No. 2008-0273 – Feed-In Tariffs Investigation  
Response to Commission's Scoping Paper  
Appendices A and C (Non-Legal Questions)

Hawaiian Electric Company, Inc. ("HECO"), Hawaii Electric Light Company, Inc. ("HELCO"), Maui Electric Company, Limited ("MECO") (collectively the "HECO Companies") and the Division of Consumer Advocacy, Department of Commerce and Consumer Affairs (the "Consumer Advocate") respectfully submit their joint response to the questions<sup>1</sup> identified in Appendices A and C of the scoping paper entitled "Feed-In Tariffs: Best Design Focusing Hawaii's Investigation" (Scoping Paper"), attached to the Commission's letter dated December 11, 2008 in the above subject docket.

Sincerely,

*Catherine P. Awakuni*  
for Catherine P. Awakuni  
Division of Consumer Advocacy

*Darcy Endo-Omoto*  
Darcy Endo-Omoto  
Hawaiian Electric Company, Inc.  
Hawaii Electric Light Company, Inc.  
Maui Electric Company, Limited

Attachment

cc: Service List

<sup>1</sup> The joint response of the HECO Companies and the Consumer Advocate to the threshold legal questions in Appendix A was filed on January 12, 2009.

SERVICE LIST  
(Docket No. 2008-0273)

CATHERINE P. AWAKUNI  
EXECUTIVE DIRECTOR  
DEPT OF COMMERCE & CONSUMER AFFAIRS  
DIVISION OF CONSUMER ADVOCACY  
P.O. Box 541  
Honolulu, Hawaii 96809

2 Copies  
Via Hand Delivery

MARK J. BENNETT, ESQ.  
DEBORAH DAY EMERSON, ESQ.  
GREGG J. KINKLEY, ESQ.  
DEPARTMENT OF THE ATTORNEY GENERAL  
425 Queen Street  
Honolulu, Hawaii 96813  
Counsel for DBEDT

1 Copy U.S. Mail

CARRIE K.S. OKINAGA, ESQ.  
GORDON D. NELSON, ESQ.  
DEPARTMENT OF THE CORPORATION COUNSEL  
CITY AND COUNTY OF HONOLULU  
530 South King Street, Room 110  
Honolulu, Hawaii 96813

1 Copy U.S. Mail

LINCOLN S.T. ASHIDA, ESQ.  
WILLIAM V. BRILHANTE JR., ESQ.  
MICHAEL J. UDOVIC, ESQ.  
DEPARTMENT OF THE CORPORATION COUNSEL  
COUNTY OF HAWAII  
101 Aupuni Street, Suite 325  
Hilo, Hawaii 96720

1 Copy U.S. Mail

MR. HENRY Q CURTIS  
MS. KAT BRADY  
LIFE OF THE LAND  
76 North King Street, Suite 203  
Honolulu, Hawaii 96817

1 Copy U.S. Mail

MR. CARL FREEDMAN  
HAIKU DESIGN & ANALYSIS  
4234 Hana Highway  
Haiku, Hawaii 96708

1 Copy U.S. Mail

SERVICE LIST  
(Docket No. 2008-0273)

MR. WARREN S. BOLLMEIER II PRESIDENT HAWAII RENEWABLE ENERGY ALLIANCE 46-040 Konane Place, #3816 Kaneohe, Hawaii 96744	1 Copy U.S. Mail
DOUGLAS A. CODIGA, ESQ. SCHLACK ITO LOCKWOOD PIPER & ELKIND TOPA FINANCIAL CENTER 745 Fort Street, Suite 1500 Honolulu, Hawaii 96813 Counsel for BLUE PLANET FOUNDATION	1 Copy U.S. Mail
MR. MARK DUDA PRESIDENT HAWAII SOLAR ENERGY ASSOCIATION P.O. Box 37070 Honolulu, Hawaii 96837	1 Copy U.S. Mail
MR. RILEY SAITO THE SOLAR ALLIANCE 73-1294 Awakea Street Kailua-Kona, Hawaii 96740	1 Copy U.S. Mail
JOEL K. MATSUNAGA HAWAII BIOENERGY, LLC 737 Bishop Street, Suite 1860 Pacific Guardian Center, Mauka Tower Honolulu, Hawaii 96813	1 Copy U.S. Mail
KENT D. MORIHARA, ESQ. KRIS N. NAKAGAWA, ESQ. SANDRA L. WILHIDE, ESQ. MORIHARA LAU & FONG LLP 841 Bishop Street, Suite 400 Honolulu, Hawaii 96813 Counsel for HAWAII BIOENERGY, LLC Counsel for MAUI LAND & PINEAPPLE COMPANY, INC.	1 Copy U.S. Mail

SERVICE LIST  
(Docket No. 2008-0273)

MR. THEODORE E. ROBERTS  
SEMPRA GENERATION  
101 Ash Street, HQ 12  
San Diego, California 92101

1 Copy U.S. Mail

MR. CLIFFORD SMITH  
MAUI LAND & PINEAPPLE COMPANY, INC.  
P.O. Box 187  
Kahului, Hawaii 96733

1 Copy U.S. Mail

MR. ERIK KVAM  
CHIEF EXECUTIVE OFFICER  
ZERO EMISSIONS LEASING LLC  
2800 Woodlawn Drive, Suite 131  
Honolulu, Hawaii 96822

1 Copy U.S. Mail

JOHN N. REI  
SOPOGY INC.  
2660 Waiwai Loop  
Honolulu, Hawaii 96819

1 Copy U.S. Mail

GERALD A. SUMIDA, ESQ.  
TIM LUI-KWAN, ESQ.  
NATHAN C. SMITH, ESQ.  
CARLSMITH BALL LLP  
ASB Tower, Suite 2200  
1001 Bishop Street  
Honolulu, Hawaii 96813  
Counsel for HAWAII HOLDINGS, LLC, dba FIRST WIND HAWAII

1 Copy U.S. Mail

MR. CHRIS MENTZEL  
CHIEF EXECUTIVE OFFICER  
CLEAN ENERGY MAUI LLC  
619 Kupulau Drive  
Kihei, Hawaii 96753

1 Copy U.S. Mail

MR. HARLAN Y. KIMURA, ESQ.  
CENTRAL PACIFIC PLAZA  
220 South King Street, Suite 1660  
Honolulu, Hawaii 96813  
Counsel for TAWHIRI POWER LLC

1 Copy U.S. Mail

SERVICE LIST  
(Docket No. 2008-0273)

SANDRA-ANN Y.H. WONG, ESQ.  
ATTORNEY AT LAW, A LAW CORPORATION  
1050 Bishop Street, #514  
Honolulu, HI 96813

1 Copy U.S. Mail

Counsel for ALEXANDER & BALDWIN, INC.,  
Through its division, HAWAIIAN COMMERCIAL & SUGAR COMPANY

# Appendix A:

## RESPONSE TO APPENDIX A:

### Summary Table of Cost Data

Project Definition	Capital Costs (\$/kW) <sup>1,2,7</sup> <sup>10</sup>	Expected Life (Years)	Capacity Factor <sup>3,8,9,10</sup>	Annual Output per kW (kWh)	Inverter Replacement Cost (\$/kW) <sup>4</sup>	Fixed Operating Costs (\$/kW/year)	Annual Variable Operating Costs (\$/kWh) <sup>5,6</sup>
Solar PV (< 10 kW)	\$ 8,500	25	17%	1,489	\$ 700	\$ 28	\$ 0.020
Solar PV (10 - 250 kW)	\$ 8,000	25	17%	1,489	\$ 700	\$ 28	\$ 0.015
Solar PV (> 250 kW)	\$ 7,000	25	17%	1,489	\$ 700	\$ 28	\$ 0.015
Concentrating Solar PV (10 - 250 kW) <sup>11</sup>	\$ 8,400	25	18%	1,563	\$ 700	\$ 28	\$ 0.019
Concentrating Solar PV (> 250 kW) <sup>11</sup>	\$ 7,350	25	18%	1,563	\$ 700	\$ 28	\$ 0.019
Small Wind (~5 kW, 50 ft tower, CL 4 site)	\$ 4,000	25	23%	1,995	\$ 700	\$ 28	\$ 0.030
Small Wind (~50 kW, 80 ft tower, CL 4 site)	\$ 4,000	25	22%	1,885	\$ 700	\$ 28	\$ 0.030
Small Wind (~100 kW, 100 ft tower, CL 4 site)	\$ 4,000	25	22%	1,920	\$ 700	\$ 28	\$ 0.030
Small Wind (~5 kW, 50 ft tower, CL 6 site)	\$ 4,000	25	35%	3,103	\$ 700	\$ 28	\$ 0.030
Small Wind (~50 kW, 80 ft tower, CL 6 site)	\$ 4,000	25	33%	2,933	\$ 700	\$ 28	\$ 0.030
Small Wind (~100 kW, 100 ft tower, CL 6 site)	\$ 4,000	25	34%	2,986	\$ 700	\$ 28	\$ 0.030
Geothermal (100 kW)	\$ 4,000	20	90%	7,884	\$ 700	\$ 35	\$ 0.024

#### notes:

<sup>1</sup> Cost of generation data provided by KEMA. In general, costs in Hawaii are typically higher than in the U.S. mainland due to higher wages, lower productivity, smaller skilled labor pool (required import of labor and associated higher costs), cost of transportation, and higher commodity prices.

<sup>2</sup> Annual output based on capacity factor; fixed O&M based on inverter replacement cost at year 15

#### sources:

<sup>1</sup> Solar installation costs estimated from CSI PowerClerk data downloaded on 1/21/2009. Solar installation cost and life expectancy data from Lawrence Berkeley National Laboratory study, "An Empirical Investigation of PV Cost Trends, and Implications for Incentive Program Design" by Ryan Wiser, Galen Barbose, Carla Perlman; presented at Power International in San Diego, CA on October 15, 2008

<sup>2</sup> Wind installation cost and life expectancy data from U.S. DOE, "Annual Report on U.S. Wind Power Installation, Cost, and Performance Trends 2007" by Ryan Wiser, Mark Bolinger (May 2008); geothermal life expectancy data from Geothermal Energy Association

<sup>3</sup> Capacity factor from CPUC Self Generation Incentive Program Solar Costs and Incentive Factors Final Report, February 2007

<sup>4</sup> Inverter cost data from American Solar Energy Society, "A New Solar Financial Analysis Calculator" by Andy Black; presented at Solar 2006 in Denver, CO on July 2006.

<sup>5</sup> Variable operating cost data for solar from NREL study, "Rooftop Photovoltaics Market Penetration Scenarios" by J. Pakdipati, et al. (February 2008)

<sup>6</sup> Variable O&M cost data for geothermal from Geothermal Energy Association, "Factors Affecting Costs of Geothermal Power Development" by Cedric Hance (August 2005); VOM data for wind from DOE source above

<sup>7</sup> Geothermal capital costs obtained from US DOE website: <http://www1.eere.energy.gov/geothermal/faqs.html>

<sup>8</sup> Concentrating PV (CPV) Capacity Factor obtained from an NREL Solar Advisor Model (SAM) simulation located in Kahului. Most other locations are not as well suited toward CPV technologies.

<sup>9</sup> Geothermal Capacity Factor obtained from US DOE website: <http://www1.eere.energy.gov/geothermal/faqs.html>

<sup>10</sup> Wind Capital Costs and Capacity Factor from "2008 AWEA Small Wind Turbine Global Market study"

<sup>11</sup> CPV Technologies are very new with various designs and very little actual cost and field data available. Values presented were chosen assuming some correlation to flat plate PV

# Appendix C:

***The Commission should direct the parties to respond to the following questions. Please provide detailed responses including supporting calculations and assumptions, underlying reasoning, and supportive citations. Responses to the threshold legal issues are due within 30 days. Responses to all other questions are due in 45 days.***

**Threshold Issues (Legal)**

1. If the price associated with a feed-in tariff exceeds the utility's avoided cost, then by definition the utility's customers will incur higher costs than they would in the absence of the feed-in tariff. Please comment on the legal implications of this result. For example:
  - a) Is this result permissible under current Hawaii statutes?
  - b) Does HRS § 269-27.2 create a ceiling on the feed-in tariff price?
  - c) If so, how do the signatories to the Energy Agreement (or other parties to this proceeding) propose to demonstrate that each feed-in tariff price does not violate the statute?
2. As with any administrative agency decision, a Commission decision approving a feed-in tariff must be supported with substantial evidence.
  - a) Focusing on the price term, what evidence is legally necessary? Consider these options, among others:
    - i) evidence of actual costs to develop similar projects in Hawaii
    - ii) generic (i.e., non-Hawaii) evidence of costs associated with each particular technology
    - iii) evidence that the tariff price results in costs equal to or below the utility's avoided cost
  - b) By what process do the signatories (and other parties to this proceeding) propose to gather this evidence and present it the Commission, under the procedural schedule proposed by the signatories?
3. Assume the Commission does create feed-in tariffs, which entitle the seller to sell to the utility at the tariff price.
  - a) If the tariff price exceeds the utility's avoided cost, is there a violation of PURPA, provided the seller is relying on a state law right to sell rather than a PURPA right to sell?
  - b) If the tariff price exceeds the utility's avoided cost (as calculated prior to the existence of the tariff), could a seller assert a PURPA right to a sale at the tariff price, on the grounds that the utility now has a new "avoided

cost" equal to cost it would have incurred under the state-mandated feed-in tariff?

- c) If the price associated with a feed-in tariff is less than the utility's avoided cost, what benefit does the tariff offer the developer that is not already available under PURPA?
- d) Please offer any other comments concerning the legal and practical relationship between the feed-in tariff and existing PURPA rights and obligations.

#### **Other Threshold Issues**

- 4. Feed-in tariffs, if approved by the Commission, would join an array of legislative and regulatory initiatives to boost production of renewables in Hawaii. Those initiatives include PURPA, the renewable portfolio standard, net metering and various distributed generation actions. Are there overlaps, redundancies, gaps among these multiple initiatives? What is the independent purpose of each of these, in relation to the others?

#### **Response:**

As discussed in the Commission's December 11, 2008 paper entitled "Feed-In Tariffs: Best Design Focusing Hawaii's Investigation" ("Scoping Paper"):

*Hawaii already has other mechanisms in place that are designed to encourage the development of renewable resources, including in part: a renewable portfolio standard, the requirement that utilities purchase electricity from qualifying facilities at avoided cost in compliance with PURPA, net metering for smaller renewable installations, high retail rates and competitive bidding programs for renewable resources.*

(Scoping Paper at 4)

The joint proposal for Feed-In Tariffs (FIT), including the KEMA report entitled *HECO Feed-In Tariff Program Plan* ("KEMA Report"), submitted by the HECO Companies and Consumer Advocate on December 23, 2008 provides a mechanism which complements and supplements the programs already in place to encourage the development of renewable resources in Hawaii.

The State's renewable portfolio standard calls for each electric utility company to procure 20 percent of its net electricity sales from renewable electrical energy by 2020, with interim stepping stones of 10 percent by 2010 and 15 percent by 2015. The recently signed Hawaii Clean Energy Initiative (HCEI) Agreement would require an increase in the RPS target to 40 percent by 2030, and a requirement that energy efficiency and renewable displacement technologies no longer be eligible for RPS compliance starting in 2014. The FIT proposal would provide

another significant policy tool for meeting RPS targets under these new parameters.

The Public Utility Regulatory Policies Act of 1978 (PURPA) encourages the development of independent, nonutility cogeneration and small power projects. Title 6, Chapter 74 of the Hawaii Administrative Rules sets forth the rigorous standards to qualify as a cogeneration or small power production facility in Hawaii and does not restrict the energy source for these facilities solely to renewable resources.<sup>1</sup>

The Company's net energy metering (NEM) program was originally available to eligible customer-generators with a capacity of not more than 50 kilowatts until the total rated generating capacity of eligible customers equals 0.5 percent of the electric utility's system peak demand. Through subsequent agreements approved by the Commission, the maximum size of the eligible customer-generator that can qualify for a NEM agreement was increased to 100 kW and the NEM system cap was also increased. Consistent with the HCEI Agreement, the HECO Companies and the Consumer Advocate propose that no applications for new net energy metering contracts will be accepted once the FIT is formally made available to customers (targeted for July, 2009). All net energy metering systems under contract, or contracts in the process of utility review at the time the FIT is formally made available to customers, will be grandfathered. Such grandfathering would apply for the life of the net energy metered system. Expansion of net energy metering system capacity will not be allowed once the FIT is established.

The joint FIT proposal offers a fixed-price contract over a specified term with specified operating conditions to eligible renewable energy generators.<sup>2</sup> A FIT is best suited for renewable energy projects that lend themselves to the use of standardized energy payment rates and power purchase contract terms and conditions, and which can be developed and interconnected to the utility grid in a relatively predictable and systematic manner. Consequently, the proposed FIT initially targets renewable resources that: (1) do not require complex environmental and land use permitting which may impose significant uncertainties in project development timeframes and costs; (2) do not typically, by virtue of their operating characteristics and size relative to the utility system, require extensive and lengthy interconnection studies or the need for significant interconnection requirements; (3) have existing or proposed projects utilizing the

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<sup>1</sup> A qualifying small power production facility may use oil, natural gas, or coal to the extent that the use of these resources by a facility does not, in the aggregate, exceed twenty-five per cent of the total energy input of the facility during any calendar year period. (H.A.R. Sec. 6-74-5 (e)(2).)

<sup>2</sup> KEMA Report, Page 8.

same technology which have already addressed complex financial accounting issues relative to utility power purchase contracts, and (4) have already been, or are currently in the process of being, implemented in Hawaii in commercial (non-R&D) applications.

Accordingly, the FIT program would be complementary to and/or supplement the State's RPS, implementation of PURPA, NEM and other distributed generation programs rather than constitute a mutually exclusive policy mechanism. As elaborated in the HCEI Agreement, FITs provide a mechanism to stimulate renewable energy development by providing predictability and certainty with respect to the future prices to be paid for renewable energy

### **Process and General Feed-in Tariff Issues**

5. Please explain the criticality of completing the "best-design" phase of this investigation by March 2009 and having project-based FiTs in place by July 2009 as called for in the Agreement.

#### Response:

The parties to the HCEI Agreement believe that time is of the essence in establishing the feed-in tariff, due to the desire to provide a stimulus for renewable energy development by providing predictability and certainty where reasonable and appropriate with respect to the prices to be paid by the utility for renewable energy. That said, the desire to initiate a FIT as soon as possible must be balanced with the very real need to establish a FIT that appropriately considers pricing, technical integration, system reliability and safety, rate impacts, and other factors. The joint FIT proposal filed by the HECO Companies and the Consumer Advocate is intended to achieve this balance, serving as a starting point with targeted technology types and sizes, along with annual targets for the amount of renewables to be contracted each year under the FIT. The FIT is proposed to be updated within two years of its initiation, and reviewed every three years thereafter to add to the list of FIT-eligible technologies, update pricing levels, and review targeted annual FIT quantities, as appropriate.

The Commission's January 20, 2009 Order establishing a procedural schedule for this investigation is appropriate and reasonable to establish such an initial FIT.

6. Please explain why project-based FiTs are superior to other methods that require a utility to purchase renewable electricity.

#### Response:

The HECO Companies and Consumer Advocate propose that a FIT be one of several renewable resource acquisition mechanisms that operate in parallel, with the FIT specifically targeted at distributed resources for which there is a suitable

experience base in Hawaii. The FIT will complement (1) the Framework for Competitive Bidding, (2) negotiated power purchase agreements, and (3) the PV Host Program to be developed by the HECO Companies.

A FIT should be the preferred mechanism for the utility to purchase renewable energy from proven distributed energy resources, as these resources lend themselves more readily to standardized contracting under a FIT approach. Other mechanisms may be more appropriate in targeting development of certain resources. For example, larger dispatchable resources or technologies requiring large economies of scale are more effectively encouraged and developed using the Framework for Competitive Bidding. (KEMA Report, Section 3.2.)

From the perspective of meeting the State's energy independence and renewable energy policy goals and objectives, the FIT should be considered superior to the PURPA avoided cost arrangements and the NEM program. The FIT provides a standard offer arrangement with known, long-term fixed pricing that should, if properly calculated, provide for recovery of the costs of the renewable resource plus a reasonable return to the owner/developer. The pricing under the PURPA avoided cost arrangements and the NEM program are not readily known or predictable, can be quite volatile, and may not have a direct relationship to the revenue stream needed by the owner/developer considering the economic feasibility and risk of taking on a renewable resource project.

From the perspective of ratepayers, the FIT can be considered superior to other PURPA avoided cost arrangements and the NEM programs. Under the FIT, rates to customers will be based on the costs of the renewable resources plus a reasonable return to be established by the Commission. Ratepayers should therefore realize the long-term benefits of renewable resources (as well as the predictability and certainty of long-term, fixed, cost-based pricing). Under the PURPA avoided cost arrangements, the pricing is heavily weighted to the cost of oil. Under the PURPA avoided cost arrangements, any amounts paid by the utility (and recovered from ratepayers) above the renewable project's costs plus a reasonable profit go to the owner/developer. The same is true under the NEM program with the NEM customer being subsidized to an extent by all other ratepayers.

A FIT may also be preferable to site owners over NEM for the following reasons:

- Retail rates are subject to fluctuation, such as due to the rise and fall of oil prices, and vary depending on the type of customer (Schedule P, Schedule J, Schedule R, etc.). Thus, the benefits of NEM differ for each customer and may at times be marginal for some. Feed in tariffs offer a predictable return on investment without volatility of retail pricing of electricity.
- The FIT generator is paid a stabilized rate for all of the electricity fed to the grid. There is no annual "true-up" at the end of the year where the NEM customer might forfeit unused NEM credit.

- The FIT provides an incentive for customer-generators to make full use of their sites to generate energy to sell to the electric utility. Under NEM, customer renewable generating systems are sized mainly to serve on-site customer loads, with minimal excess power exported to the grid.
- Under NEM, there is little incentive provided to building owners who lease their facilities out, as the building owners are not large users of the electricity. The tenants of the building, the electric consumers, are not incented to install renewable generation under NEM since they do not own the facility. A FIT provides an option for site owners to install renewable generation, whether or not they use electricity at the site. Furthermore the site owner is not subject to risk of vacancy, since all power produced will be bought by the utility.
- NEM is not applicable to development of renewables at green-field sites where there is no electric load. A FIT provides an efficient mechanism for owners of vacant land to develop renewables.

7. Please quantify the costs over avoided costs of an open-ended PBFiT program assuming the utility meets the RPS goals set forth in the Agreement.

Response:

Such quantification is not available at this time. The HECO Companies and Consumer Advocate do not propose that an "open-ended" FIT be established. As discussed in the joint FIT proposal filed on December 23, 2008, the FIT should be viewed as one of several mechanisms for the acquisition of renewable energy to meet the RPS and other targets of the HCEI Agreement, the FIT should be appropriately targeted at certain technology types and sizes, and the FIT program scope should be managed and periodically reviewed within the broader portfolio of renewable resource acquisition options. It will be possible to quantify the costs of the proposed FIT once energy payment rates and the parameters of the FIT program are established, including annual contracted capacity amounts, in the course of the FIT investigative proceeding.

8. Please quantify the benefits of lowering oil imports, increasing energy security, and increasing both jobs and tax base for the state mentioned in the Agreement.

Response:

The listed actions are consistent with the Hawaii State Planning Act, § 226-18, HRS. The State Planning Act identifies the following objectives for the State:

1. Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;

2. Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased;
3. Greater energy security in the face of threats to Hawaii's energy supplies and systems; and
4. Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use.

Quantification of these strategic policy objectives is difficult and requires complex economic and energy modeling for the State of Hawaii. The utilities' proposed Clean Energy Scenario Planning process will quantify different utility planning options specific to the electric utility sector, but not transportation and other sectors of energy use that are also included in HCEI.

9. Is the goal to encourage as much use of renewable resources as possible as soon as possible, or is it to encourage the orderly introduction of renewable resources based upon cost effectiveness?

Response:

The HECO Companies' position is that the goal of the FIT program is to encourage the orderly introduction of renewable resources based upon cost effectiveness, and maintaining a stable electric grid and system reliability. The HCEI Agreement states the following:

As we move from central-station, oil-based firm power to a much more renewable and distributed and intermittent powered system, we accept that the operating risks of the Hawaiian Electric Companies will increase which may potentially affect customers. Thus, we recognize the need to assure that Hawaii preserves a stable electric grid to minimize disruption to service quality and reliability. In addition, we recognize the need for a financially sound electric utility. Both are vital components for our achievement of an independent renewable energy future. (HCEI Agreement, page 1.)

A goal of the FIT program is to provide reasonable incentives to cost-effective renewable energy providers while minimizing costs to ratepayers. In addition, technical issues must be addressed appropriately in the design of the FIT to ensure that system reliability is maintained. For example, there are presently challenges on the HELCO and MECO systems to maintain stable system frequency due to the variability of intermittent generation and displacement of generation performing critical grid services. For all HECO, HELCO, and MECO systems, the technical challenges associated with integration of variable generation increase as the grid penetration level increases.

Given the desire to ensure that the rates established in the FIT for the various renewable technologies and size of technologies are reasonable, the HECO

Companies propose the first phase of the FIT should target those renewable energy technologies with a proven track record in Hawaii and with known cost data. This will help to ensure that the rates established for the FIT are reflective of the cost of generation plus a reasonable profit, and help to maintain system reliability given that the impacts of the operating characteristics of the technologies on the utility's system are somewhat known. The FIT should be regularly reviewed to encompass more technologies and adjust rates if necessary, and propose to do so within two years of the initial FIT, with ongoing reviews every three years thereafter.

The HECO Companies propose annual FIT targets on installed capacity by technology and size ranges. The annual targets should be based on various considerations including rate payer impacts and orderly introduction of renewable resources which will allow each island system operator to monitor the impact of additional renewable resources on operating the system to maintain system frequency and system reliability.

**10. How long a period should exist between mandatory Commission reviews of the PBFiTs?**

Response:

The HECO Companies and the Consumer Advocate assert that the FIT rates should be reviewed at regular intervals to ensure that the rates accurately reflect current costs and to evaluate the appropriateness of incorporating additional technologies under the FIT. As stated in its Joint Proposal:

*The HECO Companies and the Consumer Advocate stress that the FIT should be regularly reviewed to encompass more technologies, and propose to do so within two years of the initial FIT, with ongoing reviews every three years thereafter.*

(Joint Proposal at 5)(emphasis added)

The initial review should occur as soon as practical while allowing adequate time to observe the effects of the FIT. In recognition of the keen interest in the FIT, it is proposed that the first review occur within two years.<sup>3</sup> This is minimum time required to collect additional cost information, evaluate the feasibility of other renewable generation technologies and to assess the impact on stakeholders. Thereafter, reviews every three years will allow sufficient time to collect comprehensive information to revise the FIT.

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<sup>3</sup> The review should be completed within two years. This requires that the review process begins at least six months prior to the end of the two-year period.

### **PBFiT General Design Issues**

11. Do each of the technologies listed as a renewable resource in the RPS legislation require a PBFiT?

Response:

No. A FIT can complement other mechanisms to acquire renewable energy, out of recognition that other mechanisms may be more appropriate in targeting development of certain resources. For example, larger dispatchable resources or technologies requiring large economies of scale are more effectively encouraged and developed using the PUC's Framework for Competitive Bidding. (KEMA Report, page 9.)

12. Should PBFiTs for certain technologies be established now while others are deferred?

Response:

Yes. HECO and the Consumer Advocate agree that initially, the FIT should target those technologies that are actively being developed in Hawaii because of the availability of specific cost data upon which to develop the FIT rate for each such technology. In addition, the impact of the operating characteristics of these types of technologies is generally known. Finally, the recommended project types and sizes are expected to be more straightforward to implement because the interconnection requirements are not as complex as those of larger systems and lend themselves to use of standardized energy rates and power purchase contracting. Focusing on these resources will allow the Commission and stakeholders to more readily develop the initial FIT. HECO and the Consumer Advocate stress that the FIT should be regularly reviewed to encompass more technologies, and propose to do so within two years of the initial FIT, with ongoing reviews every three years thereafter.

Thus, the proposed FIT initially targets renewable resources that (1) do not require complex environmental and land use permitting which may impose significant uncertainties in project development timeframes and costs; (2) do not inherently, by virtue of their operating characteristics and size relative to the utility system, require extensive and lengthy interconnection studies which may identify the need for significant interconnection requirements; (3) utilize technologies for which complex financial accounting issues relative to utility power purchase contracts have already been addressed, and (4) have already been, or are currently in the process of being, implemented in Hawaii in commercial, non-R&D, application. Based on these criteria, the HECO Companies and the Consumer Advocate propose that the initial FIT be focused on photovoltaics, concentrated solar power, in-line hydropower, and wind, with individual project sizes targeted to provide a greater likelihood of more straightforward

interconnection, project implementation and use of standardized energy rates and power purchase contracting. (KEMA Report, pages 16-18.)

13. Should the Commission cap purchases under PBFiTs? If yes, what is the maximum amount? Should individual caps be set for each technology? What period should the cap cover? What is the measurement for the cap (e.g., dollars, percent of sales, kW, or kWh)?

Response:

Purchases under the FIT should be capped on the basis of installed or contracted capacity (kW). As described in Section 3.6 of the KEMA Report:

Annual FIT quantity targets will be established for each technology for each island and will be regularly updated in the course of the FIT Update. The annual quantity targets will be based on both technical and non-technical considerations, including the following:

- ***Renewable portfolio standards requirements ("RPS").*** The Hawaii RPS requires the HECO Companies to obtain 20 percent of net electricity sales from renewable electrical energy by 2020. The HCEI Agreement proposes to increase the RPS renewable generation requirement to 40 percent by 2030. The FIT will serve to incent the installation of renewable generation at an increased rate.
- ***The goals of the Hawaii Clean Energy Initiative ("HCEI").*** The overarching objective of the HCEI is the "economic and culturally sensitive use of natural resources to achieve energy supply security and price stability for the people of Hawaii, as well as significant environmental and economic opportunities and benefits." A FIT will act to allow for the economic development of the State's abundant renewable resources, which will provide both environmental and economic benefits by reducing reliance on expensive, imported fossil fuels.
- ***Technical attributes of the resources.*** Higher annual FIT quantity targets can be set for FIT systems that support reliable grid management such as low-frequency ride through, the ability to provide reactive power and the ability to be curtailed or dispatched by utility system operators.
- ***Characteristics of the utility systems being interconnected.*** Certain HECO Companies are able to incorporate more FIT generation than others, due to variations in the size and robustness of the transmission and distribution grid and the differences in customer load among the islands. The annual quantity targets will be designed to account for these differences.
- ***Cumulative amounts of installed variable resources.*** Setting of the annual FIT quantity targets for each island must consider the cumulative amount of variable generation that is installed island-wide, including via resource acquisition mechanisms besides the FIT. Certain HECO Companies already have a significant level of RPS-eligible and distributed generation capacity and may have correspondingly less ability to incorporate higher levels of FIT-eligible

resources. HELCO, for instance, already receives over 30 percent of its energy from RPS-eligible resources, with an increasing level from distributed generation resources. The large penetration of variable, non-dispatchable generation has resulted in fewer generating units on-line providing grid stabilization and frequency regulation, reduced island system stability, and greater frequency swings due to the variable generating output from wind and PV technologies. Curtailment of renewable generation at HELCO is already occurring at times to maintain system stability.

There is a need to establish high level cumulative system targets for intermittent generation by island to avoid system stability issues and reduced system reliability. The cumulative system capacity targets should include all variable generation including independent power producers, net energy metered systems, and FIT systems that will contribute to island system stability issues. The high level cumulative target settings by island will be incorporated and regularly updated in the CESP process. The annual FIT quantity targets will take this into account when the data become available. In the interim, to manage this issue for those island systems that are already highly sensitive to adding more variable resources such as at HELCO, the initial proposed FIT will target resources with grid-friendly features.

- ***Impacts on curtailment of as-available energy from existing resources.*** Some of the HECO Companies already curtail generation, including renewable energy generation, in order to maintain system reliability, such as during times of high wind generation at minimum system load periods. Adding additional variable generation via the FIT that is not controllable may increase the amount and frequency of existing renewable generation that is curtailed. The annual FIT quantity targets and requirements for curtailment of certain types of FIT resources must take this into account.
- ***Projected energy production levels.*** The HECO Companies and the Consumer Advocate have agreed to initially limit the FIT to a subset of RPS-eligible technologies in part because these technologies are already, or are in the process of being, implemented in Hawaii in commercial applications. Therefore, projected energy production levels from these FIT-eligible resources can be made with greater confidence that the energy will in fact be produced to meet ratepayer needs. There is greater uncertainty as to whether the energy from technologies that have not been deployed commercially in Hawaii, or are at a more R&D stage than other technologies will in fact materialize. Because of the proposed quantity and size targets and queing process for interconnection, it is necessary to ensure that the projects are likely to materialize. Waiting until the first FIT Update to add the Phase 2 technologies listed above will allow time for more information on cost and projected energy production levels to be gathered and increase the likelihood of successfully implementing the FIT as well as the generation technologies coming on-line.
- ***Ratepayer impacts.*** Under a FIT, the HECO Companies will purchase generation from eligible FIT resources. Annual FIT quantity targets should consider the total amount of FIT power purchase costs from year to year and the

resultant impacts on ratepayers. Consideration of ratepayer impacts should also take into account ratepayer impacts from other resource acquisition mechanisms.

- ***Impacts on utility credit ratings.*** Power purchases may affect the HECO Companies' credit rating, as the credit rating agencies view these purchases as potential debt for the HECO Companies. Should the HECO Companies' credit ratings be lowered for any reason, financing costs for the HECO Companies may increase. Therefore, the ability of the HECO Companies to purchase generation from third parties without affecting the HECO Companies' credit rating will affect the determination of annual capacity targets for the FIT. Imposing an annual FIT quantity target, plus the HCEI agreement to include 10% of the utility's purchases under the feed-in tariff in rate base through January 2015, will help mitigate this issue.
- ***Administrative resource requirements.*** Deploying the FIT will require the HECO Companies to process FIT applications, conduct Rule 14.H interconnection reviews, and otherwise administer the tariff. The annual FIT quantity target will aid in managing these administrative resource requirements.
- ***Other policy goals including the desire to provide fair opportunity to multiple developers or to encourage development of certain market segments, for example, residential and small commercial PV.*** How the FIT is designed will determine whether or not residential and small commercial PV systems can get a reasonable portion of the market share. Specific elements of the FIT should facilitate the development of these markets. These elements include quantity targets, interconnection requirements, and eligibility among others.

14. What limitations exist for integrating renewable resources onto the grid? Should these limits affect the PBFIT design or caps, or are they just another cost that developers must consider?

Response:

Limitations for integrating renewable resources onto the grid exist from an annual installed capacity basis and a cumulative system capacity basis. These limitations must be considered in the design of the FIT.

As described in section 3.6 of the KEMA Report, the HECO Companies propose annual FIT installed capacity targets by technology and size range. The annual targets should be based on both technical and non-technical considerations, as provided above in the response to Question 13.

There is also a need to establish high level cumulative system targets for intermittent renewable generation by island to avoid system stability issues and reduced system reliability. Certain HECO Companies already have a significant level of intermittent generation capacity and may have correspondingly less ability to incorporate higher amounts of FIT resources. HELCO, for instance,

already receives over 30 percent of its energy from renewable resources, with an increasing level from distributed generation resources. The large penetration of variable, non-dispatchable generation has resulted in fewer generating units on-line providing grid stabilization and frequency regulation, reduced island system stability, and greater frequency swings due to the variable generating output from wind and PV technologies. Curtailment of renewable generation at HELCO is already occurring at times to maintain system stability.

The FIT design and rates should encourage generation projects with grid-friendly features such as being utility dispatchable or curtailable, or have low-voltage/low-frequency ride-through capabilities.

### **Specific Tariff Design Issues**

15. How long should the Commission set for the PBFiT's term of obligation? Should it be different for different technologies? Is there a common basis (e.g., a conservative estimate of expected useful life) for establishing the term of obligation? On what basis should a utility pay for electricity after the term expires?

#### **Response:**

The term length for FIT contracts for new resources should be no longer than industry-standard assumptions on service life for a particular technology. For existing resources that are being brought in under a FIT, the terms should take into account the remaining useful life of the system.

Following the initial term, projects may be allowed to extend their contracts on a year-by-year basis subject to a revised FIT energy rate appropriate for the specific project circumstance, considering among other factors the remaining useful life of the system (if any), and the FIT energy payment rates in effect at the time. The utility should not be obligated to purchase any energy if the FIT contract expires and is not renewed. (See KEMA Report, page 33, Sec 3.9)

16. Should PBFiTs require the utility to purchase the project's gross or net output at the PBFTT price?

#### **Response:**

The HECO Companies and the Consumer Advocate propose that both options can be offered under a FIT. A FIT customer can opt to sell the full, gross output of the generating resource to the utility, in which case the resource is interconnected on the utility side of the customer's revenue meter. A FIT customer can also opt to sell only the "excess" power to the utility, net of the energy consumed on-site by the customer, in which case a bi-directional multi-channel meter would be used to separately measure when power is being delivered to the customer by the

utility and when power is being exported to the grid. On a monthly basis, the utility would pay the customer for the amount of power exported to the grid at the applicable FIT energy payment rate. The customer would be billed for the power it consumes from the utility grid at the applicable retail tariff rate. Note that for the purposes of determining eligibility for the FIT and in determining interconnection requirements, the gross output should be used.

17. How should the utility determine the price paid for renewable energy not covered by a PBFiT (e.g., purchases above the cap or beyond the term of obligation)?

Response:

For projects not covered by a FIT (e.g., for purchases above the FIT cap or beyond the term of the obligation), the price paid for renewable energy should be based on the utility's avoided cost. The HECO Companies have paid for as-available energy based on the utilities' filed avoided energy costs (i.e., at avoided energy costs calculated at the times of delivery), which currently vary with the price of oil. HAR § 6-74-22(c)(1). Short-run avoided energy cost rates for on-peak and off-peak energy currently are filed on a quarterly basis pursuant to HAR § 6-74-17(b).<sup>4</sup> The HECO Companies have also paid for as-available energy based on long-run avoided energy costs estimated at the time of the PPA negotiations. Long-term avoided energy costs are determined using the differential revenue requirements methodology. See HECO Companies' response to question number 1 from Appendix C to the Commission's Scoping Paper .

The HECO Companies and renewable energy developer would have to decide how the avoided costs should be determined in each scenario. In the "above the cap" scenario, one of the factors that could impact the decision is whether the renewable energy developer plans to attempt to sign up under the FIT at the next

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<sup>4</sup> With respect to avoided energy cost contracts, the HCEI Agreement (page 16) states:

The parties regard avoided energy cost based on fossil fuel prices for renewable energy contracts as a vestige of the past. The Hawaiian Electric Utilities will make a request of all existing independent power producers in which PPA are based on fossil fuel prices to renegotiate those contracts to delink their energy payment rates from oil costs and provide ratepayers with stable, long-term and predictably priced contracts. If such requests are not accepted, as opportunities arise, the Hawaiian Electric Utilities will negotiate new contracts or extensions of existing contracts to delink their energy payment rates from oil costs. . . .

All new renewable energy contracts are to be delinked from fossil fuel oil costs.

opportunity. In that scenario, the parties may decide to pursue a short-run avoided cost determination. In a "beyond the term of obligation" scenario, the additional term of an agreement to sell energy to the HECO Companies should correspond to the remaining useful life of the facility. Depending on the remaining useful life of the facility, the parties may decide to pursue a short-run avoided cost determination.

For the beyond the term of obligation scenario, an option to continue/extend to sell energy under the FIT may also be available. In that scenario, the payment may be lower than what the entity initially received under the FIT since the entity has already recovered its investment in the facility. The term would be shorter as well since the remaining useful life of the unit may be shorter than when the entity initially signed up under the FIT.

18. What inflation adjustment, if any, should the PBFiT include, using what base and indexes?

Response:

There are a wide range of approaches to adjusting feed-in tariff levels over time. These include not adjusting the tariffs at all, as was done for some resources under the 2000 law in Germany, adjusting after periodic review, adjusting tariffs according to a pre-determined schedule, as with the current German system, or adjusting the tariff according to a variable value indicator, such as average electricity rates (e.g. Spain<sup>5</sup>) or inflation (e.g. France and Portugal<sup>6</sup>).

When discussing tariff adjustment, it is also important to distinguish between external and internal adjustments. External tariff adjustments occur when a fixed, long-term tariff available in one year is adjusted in the following year. For example, a generator coming online in 2011 might lock into a lower fixed incentive level than a generator who came online in 2010. Once the incentive level is locked in, however, it does not change over the life of the contract. Internal tariff adjustments, by contrast, affect the payment levels themselves such that generators will receive a variable, rather than fixed, incentive payment over

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<sup>5</sup> Klein, A., Pfluger, B., Held, A., Ragwitz, M., & Resch, G. (2008). *Evaluation of different feed-in tariff design options - Best practice paper for the International Feed-in Cooperation* (2<sup>nd</sup> ed.). Karlsruhe, Germany and Laxenburg, Austria: Fraunhofer Institut für Systemtechnik und Innovationsforschung and Vienna University of Technology Energy Economics Group.

<sup>6</sup> Heer, K.-D., & Langniß, O. (2007). *Promoting renewable energy sources in Portugal: Possible implications for China*. Stuttgart, Germany: Centre for Solar Energy and Hydrogen Research. Prepared for the Center for Resource Solutions China Sustainable Energy Program

time. In Germany, an external tariff adjustment occurs annually according to a fixed degression schedule. In France, there are both internal and external tariff adjustments based on inflation.

In the PUC Scoping Paper, NRRI states that, "The PBFiT set today is likely to be higher than the price in subsequent PBFiTs for the same technology as the renewable market grows and becomes more knowledgeable and efficient." This would imply that, to the extent there were to be an external tariff adjustment, it would adjust downward to track gains in efficiencies over time. Although HECO and the Consumer Advocate agree with the need to place downward price pressure on renewable generators over time, HECO and the Consumer Advocate propose that no tariff schedule be established initially, and that external adjustments be made following the periodic review proposed in the Program Plan.

NRRI also seems to recommend an internal tariff adjustment based on inflation for some generators,<sup>7</sup> while also acknowledging that "Insignificant operating costs negate the need for an inflation adjustment." It is arguable that most renewable generators have minimal operating costs. The exception to this can be biomass.

HECO proposes not to have an internal inflation adjustment for several reasons. First, inflation adjustments reduce the ability of long-term fixed price contracts for renewable energy to serve as a hedge against electricity prices. Second, inflation adjustments can track both upward and downward, and this long-term variability reduces investor security for generators that have minimal operating costs. Finally, inflation adjustments can add unnecessary complexity to tariff management over time. For generators with higher operating cost risks, HECO has proposed shorter contract terms designed to provide investors with a guaranteed return in a shorter time period.

19. What milestones (e.g., commercial operations) should the Commission set to determine eligibility for the PBFiT? Are Hawaii's RPS statute requirements an eligibility requirement? Should utility affiliates be eligible to receive the PBFiT price?

Response:

Eligibility for a FIT should be based on technology type, size, and whether or not there is adequate program capacity to accommodate the project under a FIT. See Section 3.4 of the KEMA Report. Section 3.11 of the KEMA Report outlines the

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<sup>7</sup> On p. 15, "Operating costs, both fixed and variable, may increase because of inflation... An inflation adjustment removes the guesswork from presetting the rates to reflect unknown inflation and has ratepayers pay for these variable costs in current dollars. The PBFiT therefore can identify the operating costs that warrant an inflation adjustment."

HECO Companies and Consumer Advocate's proposal regarding project development assurance. To ensure that speculative projects do not tie up available capacity under the annual capacity targets proposed by the HECO Companies and the Consumer Advocate, a refundable reservation fee would be assessed when a generator applies for a FIT Agreement. The refundable fee would be set on a \$/kW basis. The reservation fee would be refunded once the generating project begins operating. However, the reservation fee, and the generator's place in the FIT queue, would be lost should project development not be completed within either a 12 month or 24 month period, as outlined in Table 3-2 of the KEMA Report.

The Hawaii RPS can be considered an eligibility requirement to the degree that a FIT should be offered only to energy technologies that qualify as renewable under the Hawaii RPS.

Utility affiliates could be eligible to receive the FIT energy payment provided that there is no queue of other projects of the same type waiting to receive a FIT contract, and appropriate regulatory requirements governing utility-affiliate transactions are established and fully complied with.

20. Please comment on the need for stepped tariffs based upon location, size, fuel mix, and output.

Response:

Feed-In Tariffs should differentiate by technology type, size, location, and other factors. As described in the response to question 29, the HECO Companies and the Consumer Advocate recommend use of a discounted cash flow analysis to establish FIT energy payment rates. Such a methodology takes into account specific costs that will differ among types of resources, such as capital and operating costs. Furthermore, as described in Section 3.5.3 of the KEMA Report (page 27), island-specific energy production amounts should be assumed in determining the FIT rates, as renewable energy resources will differ by location.

21. Under what circumstances should the PBFiT price be time-differentiated?

Response:

In the Program Plan, HECO and the CA do not propose to time differentiate the rates that generators would receive. Time differentiation has been used in several feed-in tariff policies in continental North America to date. In Canada, Ontario<sup>8</sup> differentiated its original non-solar standard offer contract by peak and off-peak

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<sup>8</sup> Ontario Power Authority. (2007). *Standard Offer Program - Renewable energy for small electricity generators: An introductory guide*. Toronto, O

generation, and British Columbia has a time differentiated standard offer schedule which varies by peak periods and by month.<sup>9</sup> In California, the feed-in tariff available to generators 1.5 MW and smaller is based on time differentiated avoided cost that varies by peak period, by season, and by utility.<sup>10</sup>

HECO and the Consumer Advocate acknowledge that there could be value in creating time differentiated feed-in tariffs for projects, particularly dispatchable resources. This would place a premium on peak production, and would encourage generators to maintain their plants in order to dispatch during periods of highest value. The value added from time differentiation needs to be weighed, however, against the increased complexity of setting and administering a time differentiated tariff. HECO and the Consumer Advocate will consider the interaction between FIT and time-of-use rates in the first FIT Update review.

22. How highly leveraged (i.e., bearing how much debt compared to equity) are these projects?

Response:

Renewable energy markets in the United States have been driven by federal tax incentives to a significant degree, including the production tax credit, the 30% investment tax credit, and the MACRS accelerated depreciation schedule. In order for project investors to take advantage of these tax incentives, there typically needs to be a large fraction of equity in the project capital structure. The larger the equity share, the smaller the share of the debt.

In contrast, in European countries such as Germany and Spain, the primary renewable energy incentive is the feed-in tariff. According to a recent report from the International Energy Agency, long-term feed-in tariffs based on generation cost create investor security and lower the cost of capital.<sup>11</sup> Moreover, the long-term nature of the feed-in tariff provides ongoing support for debt service coverage. As a result, feed-in tariffs have historically had a relatively large debt

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<sup>9</sup> BC Hydro. (2008). *Standing Offer Program rules*. Vancouver, BC.

<sup>10</sup> California Public Utilities Commission. (2007). *Opinion adopting tariffs and standard contracts for water, wastewater and other customers to sell electricity generators from RPS-eligible renewable resources to electrical corporations* (Order Instituting Rulemaking to Continue Implementation and Administration of California Renewables Portfolio Standard Program, Rulemaking 06-05-2007). San Francisco, CA

<sup>11</sup> de Jager, D., & Rathmann, M. (2008). *Policy instrument design to reduce financing costs in renewable energy technology projects*. Utrecht, the Netherlands: Ecofys International BV. Prepared for the International Energy Agency, Renewable Energy Technology Development

share. Banks have typically been willing to finance up to 85%-90% of projects because of the security of the investment<sup>12</sup>, and some German banks have financed 100% of projects with debt.

Depending on how quickly the appetite for renewable energy tax credits recovers (see below) and how the proposed feed-in tariff is ultimately structured, projects in Hawaii may or may not be highly leveraged. If the FIT is used in conjunction with the federal tax credits, then the projects will be leveraged to a lesser degree. In California, for example, the performance-based incentives (PBI) for solar systems enable a greater amount of leverage than rebates do since PBIs provide ongoing support for debt service coverage. However, the PBI has historically been paired with the federal tax credit, and so typical leverage has been 43%-46%.<sup>13</sup>

One option in the FIT tariff design would be to develop a differentiated feed-in tariff based on whether or not the production tax credit is available. If the tax credits expire in the future and the FIT is adjusted accordingly, it is likely that projects will be more highly leveraged.

Historically, FITs have created financing environments that have allowed for greater leverage and thus lower-cost financing than would be available under avoided-cost tariffs. It is important to note, however, that the observations above are based on observed historical trends. Given the current credit crisis, the debt percentage for renewable energy projects is likely to be much lower (and at a higher cost) going forward than in the past, and debt may be more difficult to source.

23. Does a PBFiT create a financing environment through a reliable revenue stream from the ratepayer to the investor, allowing for greater leverage and thus lower cost financing than would be available under an avoided-cost tariff?

Response:

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<sup>12</sup> Crespo, J. R. (2008, April 9). *European & Asian PV policy, solar markets & solar investment overview*. San Francisco, CA: New Energy Finance; see also Weiss, I., Orthen, S., Stierstorfer, J., & Gisler, R. (2006). *European best practice report: Assessment of 12 national policy frameworks for photovoltaics*. Munich, Germany: WIP. Prepared for the PV Policy Group

<sup>13</sup> Bolinger, M. (2009). *Financing non-residential photovoltaic projects:*

*Options and implications (LBNL-1410E)*. Berkeley, CA: Lawrence Berkeley National Laboratory

As explained in Section 7 of the HCEI Agreement, FITs provide a mechanism to stimulate renewable energy development by providing predictability and certainty with respect to the future prices to be paid for renewable energy. For example, FITs can reduce project developer costs, risks and complexity without significantly increasing ratepayer cost by making standard offers available to generators, without the need for potentially lengthy and costly competitive processes. The simplicity and lower transaction costs of FITs lowers the cost of project development, reduces the rate of contract failure, and increases the ability for small businesses and small projects to develop renewable energy systems.

In addition, by basing incentive levels on the cost of generation plus a reasonable return, FITs create a degree of investor security. By lowering investor risk, FITs also lower financing costs.

Even without a FIT in place, the HECO Companies have been exploring ways to structure transactions that provide renewable developers with a more reliable revenue stream. For example, some of the HECO Companies have entered into contracts that were based on fixed payment rates. The fixed pricing component provided the developers with a reliable revenue stream (provided energy is delivered to the utility) and decoupled (or partially decoupled) the payment rates to the renewable energy developer for energy from the actual price of oil at the time the energy is delivered. This was intended to reduce the energy price volatility and provide a benefit to the HECO Companies' customers in the form of pricing below avoided energy costs in the event that future oil prices remain high or even further escalate. See e.g., Docket No. 04-0365 (MECO's PPA with Kaheawa Wind Power, LLC), Decision and Order No. 21701 (filed March 18, 2005) (70% of the energy payments based on a fixed payment rate schedule); Docket No. 2008-0167 (MECO's PPA with Lanai Sustainability Research, LLC), Decision and Order (filed October 31, 2008) (100% of the energy payment rates based on a fixed payment rate schedule).

24. If the PBFiTs are to encourage early development of resources, does the reasonable return need to be set higher for these early tariffs? Are there reasons other than encouraging early development to set the profit margin higher, such as risks associated with early implementation? Is this true across all project classes?

Response:

The HECO Companies and Consumer Advocate do not propose use of a FIT to encourage early development of resources. Rather, the FIT should be used to streamline the implementation of distributed renewable resources that are known and proven, and as such, allows the establishment of standardized rates and contract terms and conditions. Having said that, profit margins should account for the fact that even among proven technologies, there may be differences in project development risks. For example, any technology that combusts fuel will be subject to discretionary environmental permitting, versus non-combusting technologies that do not require such permitting.

25. Does the current "credit crunch" affect the financing costs, including expected profits by equity investors?

Response:

The financial crisis is affecting the financing costs of renewable energy investments, including both debt (as discussed above) and the returns required by equity investors. As discussed above, tax incentives have been a significant driver for renewable energy market growth. In order to take advantage of tax incentives renewable energy developers typically partner with investors, who have a significant tax appetites, under a variety of different structures.<sup>14</sup>

The financial crisis brought the downfall of several key renewable energy tax investors, and drove others to exit the market, thereby reducing the amount of available tax equity. The shrinking pool of tax equity, compounded by factors such as changes in federal tax accounting requirements, upward trends in returns for competing tax investments such as affordable housing, and the potential for a wind development rush before the PTC expiration, has caused a sharp increase in the cost of capital for renewable energy project financing.<sup>15</sup> As of October, 2008, it was reported that required tax equity yields have increased by 2%.<sup>16</sup> A recent Lawrence Berkeley National Laboratory report concluded that this would increase the levelized revenue requirement for tax investor-financed PV by \$0.07/kWh.<sup>17</sup>

**Related Issues**

26. Please provide a quantitative analysis demonstrating the public interest aspect of the concept that 10% of the utility's purchases under the feed-in tariff PPA should be included in the utility's rate base through 2015. In addition to the overall prudence of the rate base recommendation, please address the 10% and 2015 date included in the Agreement.

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<sup>14</sup> Cory, K., Coughlin, J., & Coggeshall, C. (2008). *Solar photovoltaic financing: Deployment on public property by state and local governments* (NREL/TP-670-43115). Golden, CO: National Renewable Energy Laboratory; Harper, J. P., Karcher, M. D., & Bolinger, M. (2007). *Wind project financing structures: A review & comparative analysis* (LBNL-63434). Berkeley, CA: Lawrence Berkeley National Laboratory

<sup>15</sup> Karcher, M. (2008). *The financial crisis and renewable energy*. Irving, TX: Deacon Harbor Financial

<sup>16</sup> Ibid. Bolinger (2009)

<sup>17</sup> Ibid.

Response:

Long term purchased power agreements such as the one proposed under the Feed-In Tariff will impact the credit quality of the utility. Generally, there are three ways that any PPA may affect the utility's financial profile: 1) imputed debt treatment of the PPA, 2) capital lease obligation reflected as debt on the utility's financial statements, and 3) consolidation of the seller (including the seller's debt) on the utility's financial statements. Preliminary assessment of the proposed FIT agreement is that it will result in imputed debt. PPAs for firm capacity may result in either imputed debt or capital lease. The Company would not enter into any agreement which would result in consolidation due to the significant adverse credit quality and financial reporting compliance issues.

The Company expects that the FIT agreements will increase imputed debt or possibly result in capital lease obligations (i.e. increase actual debt). Both imputed debt and capital lease obligations negatively impact the financial profile of the utility. The increase in imputed debt or capital lease obligations increases financial risk and consume utility borrowing capacity. Over the long term, this negatively impacts all stakeholders. Developers rely on having contracts with credit worthy off-takers in order to finance their project. Customers rely on a credit worthy utility to maintain reliable service.

The inclusion of a percentage of FIT energy purchases in rate base is intended as a means of restoring the financial profile of the utility to enable it to undertake the Feed-In Tariff. This provision was proposed by the other parties (i.e., not the HECO Companies or the Consumer Advocate) as part of the HCEI package and all the parties consider it as an item for further consideration by the Commission. It reflected the parties' negotiation, at that time, of what would address the imputed debt issue, in the interests of all stakeholders.

27. What is the appropriate rate of return for the PBFiT portion of rate base that consists of a mandated purchase with guaranteed recovery and no capital outlay?

Response:

See response to question 28 below.

28. Are there preferable utility incentives, other than putting PBFiT revenues into the rate base, to encourage the development of renewable resources?

Response:

From a financial standpoint, the utility's goal with respect to purchasing renewable energy is to maintain the utility's financial integrity. Currently, the utilities are allowed recovery of purchased power expenses, subject to review in each rate case. The utilities do not have any "guaranteed recovery". Further, the utilities are liable to make payments to the independent power producer regardless

of whether such costs are recovered in rates. This results in degradation to the utility's credit quality.

The utility's preferred mechanism to address this issue is: 1) to have assurance that the purchases under the FIT agreement are in fact guaranteed recovery for the entire term of the agreement through a direct cost recovery clause and 2) to not be liable for any purchases that are not recovered in the direct cost recovery clause.

Commission assurance that the purchases under the FIT agreement are guaranteed recovery for the entire term of the agreement is essential to reducing investor risks associated with the purchased power agreement. Therefore, the utility will seek Commission assurance of "guaranteed recovery" for the entire term of the agreement in the order approving the FIT. Further, the utilities will seek to have recovery through a direct cost recovery clause (i.e. the purchased power adjustment clause requested in the rate case). Consistent with this, the utility is pursuing the implementation of a purchased power clause as discussed in the HCEI Agreement in HECO's 2009 test year rate case (Docket No. 2008-0083) and will do likewise for MECO and HELCO in their respective upcoming rate cases.

HECO proposes that in lieu of the utility earning any return on purchased power, the parties consider a FIT agreement which limits the utility's liability under the FIT agreement to the amount that the utility recovers in its rates. Under such a provision, HECO's payments to the customer-generator would be limited to the amounts recoverable in the purchased power (or other direct cost recovery) clause.

Contractual assurance that the utility will not be liable for payments which it cannot recover will help mitigate utility risk associated with purchased power agreements. The "guaranteed recovery" of payments will address customer-generator (or developer) risks as a result of the contractual provision limiting the utility's liability.

HECO is likewise unable to quantify the credit quality impact of its preferred mechanism. However, this proposal reflects the risk allocations in the concept of the utility "passing through" the costs of purchased power and mitigates the risks to investors, which is expected to be credit enhancing.

29. Should the PBFiT require developers to assign credits (e.g., investment tax credits, renewable energy credits, and carbon credits) earned from a project to the purchasing utility as a condition of receiving payments under the PBFiT? If not, how should these credits be included in the estimation of a typical project's cost?

Response:

Investment and production tax credits should not be assigned to the purchasing utility, rather they should be considered as positive cash flows to the developer when conducting a discounted cash flow analysis to determine the FIT energy

payment rate. As described in Section 3.5.2 of the KEMA Report, the HECO Companies and Consumer Advocate recommend using a model that uses a Discounted Cash Flow (DCF) analysis methodology to assess such nominal levelized feed-in tariff rates based on the cost of generation plus a target return on investment (ROI), or Internal Rate of Return (IRR), for the project over the life of the system. The base rate represents, for a project coming on line in a given year, a nominal levelized payment stream that has the same net present value (NPV) as the projected stream of costs and capital flows that provides the target IRR to project owners. This approach is similar to the more simplified Levelized Cost of Energy (LCOE) methodology commonly used for analysis of electricity generation costs. The LCOE is a measure of total costs of a system (over its expected lifetime) divided by the expected energy output (over its useful lifetime), with appropriate adjustments for the time value of money. The LCOE provides a useful mechanism to compare the cost of energy across different technologies. On a simplified basis, LCOE is the net present value of total life cycle costs divided by the quantity of the energy produced over the life of the project.

The DCF approach accounts for a comprehensive set of financial cash flow and tax inputs as well as performance characteristics in a financial model over a specified period of time. The analysis considers cash flows over the project's assumed economic life. If the contract duration is shorter than the assumed economic life, assumptions must also be made about the residual revenue stream for the remainder of the project economic life. The inputs that go into the DCF analysis include: (1) capital costs, (2) project performance, (3) initial development costs including engineering, permitting, environmental, management, legal, accounting, and contracting costs, (4) financing costs and cost of capital, (5) ongoing costs including fixed and variable O&M expenses, fuel costs (if any), replacement parts, land lease costs, insurance, state and Federal income taxes (including the tax effects of depreciation), property taxes, excise and all other applicable taxes (6) applicable Federal and state tax or other incentives, and (7) discount rate.

Using this methodology, the nominal levelized tariff energy rate can be set to cover expected costs and provide a target IRR which the Commission deems to be reasonable.

With regard to credits associated with environmental attributes of the renewable energy, any environmental credit associated with renewable energy purchased by the utility from the developer should be the property of the utility, provided, however, that such environmental credits should be to the benefit of the utility's ratepayers in that the value should be credited "above the line." The utility's purchase of the renewable energy is driven in large part by the utility's goals and obligations to acquire renewable energy. The developer should not be allowed to charge the company and its ratepayers for the value of such environmental credits, if any, since the FIT energy payment rate should have already adequately compensated the developer for the cost of generation plus provided reasonable profit. Such environmental credits are not a "cost."